# Training Detection of Preeclampsia Risk Factors for Physicians in Primary Care with Experience-Based Learning Methods: A Quasi Experimental Study

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## ABSTRACT

**Background:** Training for primary care physicians in the management of pregnant women often combines detection of the risk of bleeding, risk of infection and the risk of preeclampsia. Meanwhile, preeclampsia contributes to the world's largest maternal mortality rate, including in Indonesia. Primary care physicians' knowledge about the risk factors and the early detection of preeclampsia is still very limited. It is therefore necessary to detect preeclampsia risk factors as early as possible and perform proper, fast and effective therapeutic diagnosis to prevent the onset of preeclampsia and to make efforts to safeguard maternal health and the survival and wellness of her baby. Experiential learning was selected in this training as it allows for sustainable learning. **Methods:** Quasi experimental study was conducted with 30 physicians of Community and Primary Health Care Center (*Puskesmas*) who were randomly divided into 2 groups, i.e. treatment group and control group each with 15 people. The treatment group was given training by 2 cycles of experiential learning, then both groups rated knowledge with vignette questionnaires from international sources that have been validated by experts in obstetrics, with 1-week interval time between the post-test and pre-test. **Results:** There was an increase of knowledge in primary care physicians after receiving training for both the treatment group ($p = 0.034$) or the control group ($p = 0.000$). The increase of knowledge in the treatment group after training was higher than the control group with the mean difference of 5.733. This result shows that the use of experiential learning methods proved effective. **Conclusion:** The detection training of risk factors for preeclampsia increases the physician's knowledge in managing preeclampsia in primary care.

*Keywords: knowledge of management of preeclampsia in primary care, method of experiential learning, training of detection of risk factors of preeclampsia*

## BACKGROUND

According to the World Health Organization (WHO), it is estimated that about 8 million pregnant women experience complications and half a million of them die from complications from pregnancy per year throughout the world[1]. The incidence rate of preeclampsia is between 3 - 14% of pregnant women, and in the United States the incidence rate reaches 5 - 8% where in the last ten years no evidence was found of any significant decrease in the number of cases[2,3]. Deaths due to complications of pregnancy and childbirth in developed countries are 1 in 5,000 women, which is much lower than in developing countries, which is 1 in 11 women dying from complications of pregnancy and childbirth[4]. The high

maternal mortality rate (MMR) is still a health problem in Indonesia which reflects the low quality of health services during pregnancy and childbirth. MMR in Indonesia is one of the highest in the Southeast Asian countries. Based on the Indonesia Demographic and Health Survey (SDKI) in 2012, MMR in Indonesia amounted to 359 per 100,000 live births. Since 1991 to 2007, the number of MMR in Indonesia had decreased, from 390 to 228 per 100,000 live births. Compared to other countries in Southeast Asia, MMR in Indonesia in 2007 was still quite high at 228 per 100,000 live births, where MMR in Singapore was only 6 per 100,000 live births, Brunei 33 per 100,000 live births, Philippines 112 per 100,000 live births, and Malaysia and Vietnam both reached 160 per 100,000 live births[5].

Millennium Development Goals (MDG) target a decline in MMR to 102 per 100,000 live births by 2015, but in 2012 the SDKI recorded a significant increase in MMR in Indonesia from 228 to 359 maternal deaths per 100,000 live births. The difficulty of achieving the MDG target is due to an increase in population and the number of risky pregnancies. Based on the prediction of the US Population Census Bureau, the population of Indonesia will reach 255 million by 2015 and the number of pregnancies at risk will include 15 - 20% of all pregnancies. MMR is caused by 3 main factors: bleeding by 30%, hypertension in pregnancy by 25%, and infection by 12%. The prevalence of preeclampsia in developing countries is 1.8% - 18%, while the prevalence of preeclampsia in developed countries is 1.3% - 6%. The WHO estimates cases of preeclampsia are seven times higher in developing countries than in developed countries. In Indonesia the incidence of preeclampsia was 128,273/year or about 5.3%[5].

MMR reflects the risks faced by women during pregnancy and childbirth which are affected by maternal nutritional status, socioeconomic circumstances, adverse health conditions prior to pregnancy, the incidence of complications in pregnancy and delivery, the availability and the use of health-care facilities including prenatal and obstetric services. High MMR numbers indicate low socioeconomic conditions and health care facilities including poor prenatal and obstetric services. Maternal mortality usually occurs because mothers do not have access to quality maternal health services, especially emergency services which is caused by being late to recognize danger signs and making appropriate decisions, late to reach health facility, and late to get emergency services at health facility. Besides those concerns, the cause of maternal mortality also cannot be separated from the mother's condition itself and is one of 4 "too" criterions: too old at the time of delivery (>35 years), too young at the time of delivery (<20 years), too many children (>4 children), and too close to prior birth/parity (<2 years)[6].

Preeclampsia is a serious medical problem and has a high degree of complexity. Impact of preeclampsia not just happens in mothers during pregnancy and childbirth, but also poses postpartum problems due to endothelial dysfunction in various organs, such as the risk of cardiometabolic disease and other complications. Infants born from mothers with preeclampsia may have long-term effects such as low birth weight due to preterm labor or stunted fetal growth, as well as contributing to the magnitude of perinatal morbidity and mortality. The results of one meta-analysis showed significant increases in the risk of hypertension, ischemic heart disease, stroke and venous thromboembolism in women with a history of pre-eclampsia with relatively high risk of mortality[7].

In addition to medical problems, preeclampsia also causes economic problems, because of the cost incurred for this condition is quite high. From an analysis conducted in America the cost estimates incurred reach 3 billion US dollars per year for maternal morbidity, while for neonatal morbidity it reaches 4 billion US dollars per year. This cost will be increased when calculating the burden due to long-term preeclampsia[8].

The handling of preeclampsia cases remains controversial, because until now the etiology and pathophysiology of hypertensive diseases in pregnancy remains unclear and prevention which is appropriate and successful has not been implemented. It can be believed that casual cases and complications in labor that arise in secondary services will be suppressed by preventive efforts and repair of the antenatal care. On the other hand, vigilance is required, by providing support for the mothers with the poor education, surviving a tough economy and an unhealthy lifestyle, especially if they experience difficulty in accessing health services. Emergency professionals also have an important role in these cases by providing mentoring of emergency cases, networking communication and the availability of early services, where such services can be applied to situations with the primary care background[9].

Family doctors have a big role in the management of pregnant women at high risk, both as diagnostic and therapeutic medical staff, where Family doctors can also be a determinant of the management of pregnant women with high risk. Family doctors should be able to direct patients in obtaining services that are affordable, appropriate, targeted and coordinate in health care meaning Family doctors must master the art of effective use of resources[10]. Family doctors should be able to perform coordinated services with various parties in primary care and other specialists. Family doctors should also be able to communicate effectively between physicians and patients and be able to assist patients in primary care management principles. Ideally, Family doctors should have the ability as a manager, be able to establish good communication with patients, be a companion for patients and families, and be able to collaborate between patient needs and the ability of health facilities[10]. Family doctors can administer tests to patients in early screening (ultrasound, liver and kidney function tests, blood tests) which are helpful in determining the progression of high risk pregnant women, or coordinating with other health care workers and families so that the patient gets the management of high-risk pregnant women appropriately.

Culture, belief systems and values that exist in an area will affect the doctor's interaction with the patient. A doctor must understand this cross-cultural communication to eliminate the gap in communicating with the patient. Aspects that a physician must understand about culture include family decision makers, values of privacy, inner feelings, i.e. modesty and shame[11].

In the western countries, there have been several physician-patient communication guidelines, but based on the background of community characteristics that are different from Indonesia. People in Southeast Asian countries in general and Indonesia in particular have different cultural characteristics with western society. Indonesian society has a paternalistic culture and a very prominent social hierarchy system, allowing the domination of a physician in communicating with his patients. Southeast Asian societies have low individual autonomy; family and

community have a very big role in patient decision-making. But just as in western societies, people in Southeast Asian want equality in physician-patient relations[12].

### Research purposes

To review effect of training detection on risk factors for preeclampsia by primary care physicians toward primary care physician's knowledge in managing high risk cases of preeclampsia.

### RESEARCH METHODS

This research is a quantitative research with a quasi-experimental pre-posttest design. This design performed measurements before and after treatment in the form of training using a single control group.

### Research subjects

The subjects of this study were all general practitioner at *Puskesmas* in the Kebumen district who were willing to attend training as many as 30 people, who were divided into 2 groups, i.e. those who followed the training and those who did not attend the training.

### Research instrument

The training instruments were training guidelines for the detection of risk factors for preeclampsia by primary care physicians made with reference to experiential learning methods and the National Guidelines for Medical Services Preeclampsia year 2016. The second instrument was a questionnaire about doctor's knowledge for primary physicians that has been validated by experts from Universitas Gadjah Mada Yogyakarta, Faculty of Medicine Public Health, and Nursing.

### Research procedure

Here is a pattern of risk factor detection training procedure of preeclampsia by combining John Dewey[13] concept with the concept of experiential learning of David Kolb[14].
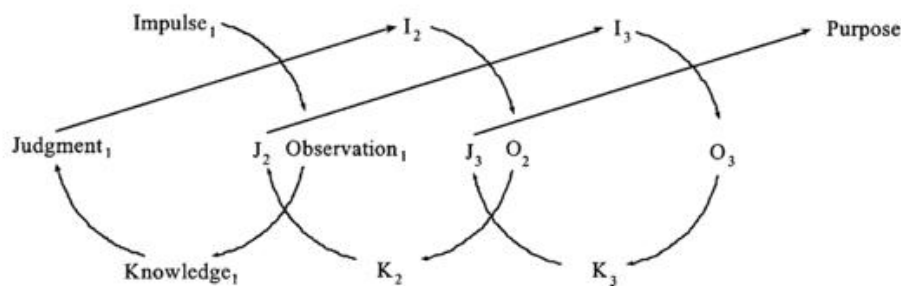


**Figure 1. Patterns of training procedures for detection of preeclampsia risk factors**

The picture above is as follows:

1. The first cycle: In Table 1 the first cycle begins with a pretest of risk factors detection for physicians who are already willing to be research respondents (the matrix of questions shown in table 3), the first event is the introduction of the trainees and provides an introduction to the intent and purpose of the research by the researchers, then starts by playing roles and screening the topic of 6 major risk cases of preeclampsia and 5 cases with minor risk. The role play topic is to know clinical understanding of primary care physicians on the management of preeclampsia at the *Puskesmas* level. In this experimental process the most important is the introduction of risk factor detection methods preeclampsia by primary care physicians as a new way. The next stage is reflective observation with a discussion of why there was a failure in an effort to reduce maternal mortality due to eclampsia with reference to the efforts that have been done and determine the steps to solve it. Then the respondents were given seminars on the risk factors detection of preeclampsia and to the staff at the *Puskesmas* level by obstetric and gynecologist physicians at the abstract conceptualization stage. The respondents aimed at introducing screening at the 2nd level health facility, as well as for follow-up management at the *Puskesmas* level. The last stage of active experimentation from the first cycle is the provision of reading assignments for the respondents, i.e. the latest international journals on preeclampsia scores, preeclampsia health care system at *Puskesmas* level and health insurance system (JKN) which

controls treatment of preeclampsia and determines the scope to be achieved from this training. The respondents then applied the training in the maternal health care services at the *Puskesmas*.

2. The second cycle: In table 2 after 1 week then the respondents discussed the risk factors detection system that has been done at the *Puskesmas*, critical appraisal to the latest journal on preeclampsia score and discussed the achievements of the first cycle as the concrete experiential stage. The next observational reflection stage is to identify the failure of risk factors detection to reach achievement in terms of competence, commitment of health officer, detection system of preeclampsia risk factor not yet optimal, and active experimental implementation of health insurance system that has not been aligned to patients and health worker. At the abstract conceptualization stage, the respondents are expected to give an overview of the best management of preeclampsia at the *Puskesmas* level in terms of physician competence, authority and efficacy of early detection program of preeclampsia. The task for the respondents is to make essays after attending early risk detection training. The last stage is for applying the training in the *Puskesmas* maternal health care services. They later do the posttest to see the progress obtained from the method of experiential learning in which the content of the questions refers to research that included in PNPK (National Guidelines for Medical Services) preeclampsia[15].

**Table 1. The first round of training in the detection of preeclampsia risk factorsby primary care physicians with experimental learning methods**

| The training phase based on the Kolb cycle[14] | Activity | Time | Problems that have been validated by experts as a pretest and posttest tool | Training Content (based on preeclampsia PNPK[15]) against the background of primary care health facilities |
|---|---|---|---|---|
| *Concrete experiential* | Role playing and watching movie cases of preeclampsia with the clinical background of 11 different risk factors for preeclampsia | 3 hours | 1 until 15 | The natural history of preeclampsia |
| *Observational reflection* | Essay writing about the experience of training participants in solving preeclampsia problems in primary health care facilities and discussions | 1 hour | 1 until 15 | The problem of high morbidity and mortality due to preeclampsia in Indonesia |
| *Abstract conceptualization* | Expert obstetrician seminar themed material from clinical screening and early diagnose of preeclampsia | 2 hours | 1,2,3,4,5,6 and 9 | Screening of active preeclampsia in primary health care facilities |
| *Active Experimentation* | Assignment and determination of achievements to be implemented in the form of follow-up plan | 1 hour | 7,8,10,11,12,13,14 and 15 | Referral and follow-up of pregnant women at high risk of preeclampsia |

**Table 2. The second round of training in the detection of preeclampsia risk factorsby primary care physicians with experiential learning methods**

| The training phase based on the Kolb cycle[14] | Activity | Time | Problems that have been validated by experts as pretest and posttest *tool* | Training Content (based on preeclampsia PNPK[15]) against the background of primary health care facilities |
|---|---|---|---|---|
| *Concrete experiential* | Discuss the task of reading journal and make critical appraisal of the latest preeclampsia scoring journal and the discovery experience in applying the previous training | 2 hours | 1 until 15 | The natural history of preeclampsia |
| *Observational reflection* | Discussion by problem based learning | 2 hours | 1 until 15 | The problem of high morbidity and mortality due to preeclampsia in Indonesia |
| *Abstract conceptualization* | Expert Training "High Risk Screening of Preeclampsia with Ultrasonography", Introduction and Training of Ultrasonography and the introduction of velocimetry | 2 hours | 1,2,3,4,5,6 and 9 | Active screening of preeclampsia in primary health care facilities |
| *Active Experimentation* | Participants apply training at *Puskesmas* in the form of a follow-up training plan | 1 hour | 7,8,10,11,12,13,14 and 15 | Referral and follow-up of pregnant women with high risk of preeclampsia |

**Table 3. Knowledge matrix for risk factors of preeclampsia in training with experimental learning methods**

| Question number | History of preeclampsia | Multiple pregnancy | Chronic hypertension | Type 1 and 2 DM | Autoimmune disease | Kidney disease | Nulliparous | History of preeclampsia in mother and sister | obesity | Age of pregnant women> 35 years | Patient-specific history (pregnancy interval> 10 years) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | √ | | √ | | |
| 2 | | √ | | | | | | | | | |
| 3 | | | | | | | | | | √ | |
| 4 | | | √ | | | | | | | | |
| 5 | | √ | | | | | | | | | √ |
| 6 | √ | √ | | | | | | √ | | | |
| 7 | | √ | | | | √ | | | | | |
| 8 | | √ | | √ | | √ | | | | | |
| 9 | √ | | | √ | | | | | | | |
| 10 | | √ | | | √ | √ | √ | | | | |
| 11 | | | | | √ | √ | | | | | |
| 12 | √ | √ | √ | | | | | | | | |
| 13 | | √ | √ | | | √ | | | | | |
| 14 | √ | √ | | | | | | | √ | √ | √ |
| 15 | √ | √ | | | | | | | √ | √ | √ |

Note: Risk factors of preeclampsia[15]

## RESULTS AND DISCUSSIONS

### Table 4. Characteristics of respondents in primary care (N = 30)

| Group | Variables | Mean | Min-Max | SD |
|---|---|---|---|---|
| **Treatment** | Age | 41.13 | 31 - 52 | 7.090 |
| | Length of work | 11.67 | 2 - 22 | 6.466 |
| **Control** | Age | 42.53 | 35 - 52 | 6.198 |
| | Length of work | 13:40 | 4 - 23 | 6.322 |

### Table 5. Effectiveness of training on the level of physicians' knowledge in primary care

| | Group | Mean | Mean difference | | p | |
|---|---|---|---|---|---|---|
| | | | a-c | b-d | a-c | b-c |
| **Pretest** | a) Treatment | 2.80 | 9 | 3 | 0.034 | 0.000 |
| | b) Control | 3.53 | | | | |
| **Posttest** | c) Treatment | 11.87 | 5.733 | | 0.000 | |
| | d) Control | 6.13 | | | | |

Effective training results were seen in the treatment group, i.e. a higher knowledge increase than the control group with an average difference of 5.733.

After the posttest in the treatment group results obtained were as follows: Respondents who still answered wrong about number 1 as many as 3 people (20%), number 2 as many as 4 people (26.6%), number 3 as many as 4 people (26.6%), number 4 as many as 3 people (20%), number 5 as many as 3 people (20%), number 6 as many as 2 people (13.3%) , number 7 as many as 3 people (20%), number 8 as many as 5 people (33.3%), number 9 as many as 2 people (13.3%), number 10 as many as 3 people (20%), number 11 as many as 3 people (20%), number 12 as many as 2 people (13.3%), number 13 as many as 3 people (20%), number 14 as many as 2 people (13.3%) and number 15 as many as 1 person (6.6%).

From the results above respondents with treatment felt difficulties in working on problem number 8 and easily completed number 15. Problem number 8 contains the definition of Superimpose Chronic Hypertension with kidney disease as a participant, and respondents faced difficulty with the definition of preeclampsia, and were especially still confused with the old definition, although the signs and symptoms are still common in patients such as edema, but it is not a diagnostic criterion. It is necessary to re-emphasize the new definition of preeclampsia in accordance with PNPK 2016 in order to obtain the accuracy of the diagnosis. It appeared that the error was still dominated by the difficulties of understanding and applying the process of diagnosis (question number 1, 2, 3, 4, 5, 7, 8, 10, 11) with an average of 22.94% of respondents still wrong in answering. While for initial management of preeclampsia (question number 6, 9, 12, 13, 14, 15) respondents with treatment group have better average which was 14.4% still wrong in answering question. It was understandable since the definition of diagnosis of preeclampsia changed, and there are some that have not known a sign of diagnosis such as edema and preeclampsia are being abolished[15]. These results also prove in adults that synaptic connections have the potential to grow rapidly in the long term. A stimulation allows the formation of nerve tissue that can last for hours, days or weeks, and can even last for a long time. The commonly used brain capacity will allow for the occurrence of growth of synapses, and the rarely used allows the loss of existing synapses[16].

In the control group, the respondents' knowledge level increased significantly by an average increase of 2.6 or mean value 6.13 or sufficient category. This is in accordance with Cercone[16] who stated that adult education starts from the situation, i.e. the main source of adult education is the learning experience that is motivated by learning needs, and since experience is the source of learning, adult education pays attention to differences in shape, time, place and environment. In the control group there was an opportunity to look for reading sources to support their knowledge of preeclampsia, pointing to a significant increase (Table 5).

It appeared that both the control and treatment groups had poor pretest results, with the pretest mean values of the control group was 3.53, while the treatment group was 2.80. These results illustrate the doctor's knowledge level in detecting risk factors for preeclampsia in Kebumen district was still lacking. But after treatment in the form of training with experiential learning methods, the treatment group has an average increase of 11.87 (good knowledge). While in the control group there was an average increase of 6.13 (sufficient knowledge). It can be concluded that the use of experiential learning methods to improve primary physicians ' knowledge is significant, and it is expected that primary care physicians can provide information to patients and their families with appropriate language so as to achieve the objectives of the training, namely the similarity of perception about how to follow-up of preeclampsia. South-Paul *et al.*[17] stated that good communication is achieved by giving open questions, giving patients a chance to express their emotions and giving more information. The physicians who have communication skills as mentioned above are expected to give understanding to the patient about the importance of self-management. This self-management
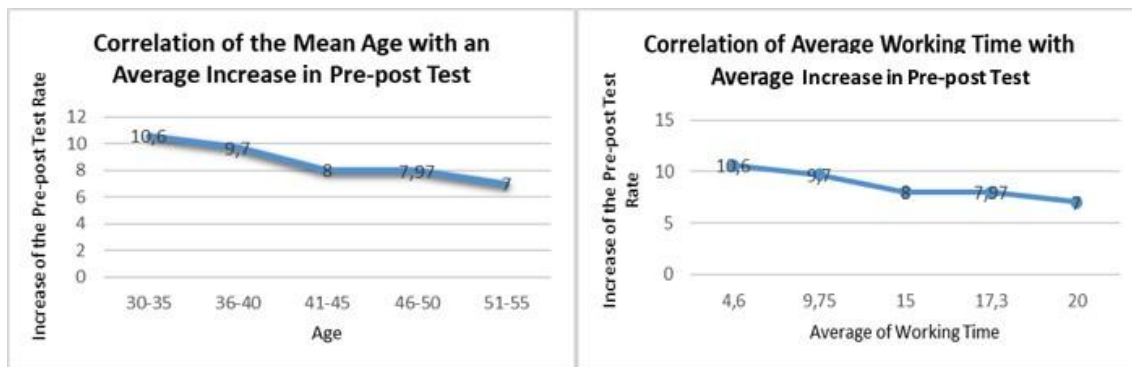
**Figure 2. Description of pre-posttest results in treatment group associated with age and duration of work**

provides understanding to the patient that the patient only occasionally needs to meet with the doctor, so the patient should be able to become a doctor for themselves. The increase of control group average was also significant, although not as much as the treatment group. Methods of experiential learning according to adult education involve: developing a sustainable self-development system, creating a learning environment that challenges thinking ability, creating enriched learning environments, creating active and meaningful learning situations for participants, and applying renewable learning strategies and learning materials[18].

The cognitive aspect changes include learning process, perception, comprehension, and slowing down withage. It is understandable that the learning process with experiential learning methods requires considerable time, effort and thought, and this burden is borne on all participants. Long-term memory relies heavily on the survival of newly formed brain cells. New cells will die within weeks if not in use. Adults need activities that will make living cells, learn a new language or music is a good example of how new memories are stored or lost due to new cell pruning[18].

### Suggestions
1) Increased physicians' proficiency in primary care on the subject of preeclampsia should be done through regular training so that primary care physicians can work more optimally, especially in active screening to detect risk factors for preeclampsia.
2) Training with experiential learning methods improves the ability of physicians in primary care in detecting risk factors for preeclampsia, and should be done with more frequent frequencies and longer duration in order to produce optimal coverage.
3) Training with ideal experiential learning methods in the group of physicians at a young age, where the increase in training outcomes is greater than older physicians, hence the need for public health department to apply this method of training when receiving civil servant physicians to improve the effectiveness of training.

### Research limitations
The subjectivity of the researchers, and the short and intermittent time that the research was conducted did not produce optimal results, and produced a narrow training

network, while this type of research in the future should also involve public health department, hospital, POGI (Indonesian Society of Obstetrics and Gynecology) and IDI (Indonesian Doctors Association).

### CONCLUSION
Training on detecting risk factors of preeclampsia is effective to enhance the primary care physician's knowledge.

### Ethical Approval and Informed Consent
Recommendation for ethical approval was given from the Chairman of Research Ethics Committee STIKES Muhammadiyah Gombong with Ethical Clearance number 99.6/IV/F/ETIK/6/2017 dated June 10th, 2017.

### Availability of Data and Materials
Please contact the author for the availability of data and material through the author's correspondence.

### Conflict of Interest
There is no conflict of interest at the time of the study nor in the writing of this publication.

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